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The Topical Application of Sulphonamides in Veterinary Practice

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Introduction.—The value to be derived from the oral or parenteral administration of sulphonamide compounds in the treatment of some of the local and general infections of animals has proved to be of overwhelming importance in veterinary practice.

When administered sulphonamide is absorbed into the blood, and it is then conveyed by the blood-stream to the scene of bacterial activity, being brought into intimate contact with the causative organisms through the medium of the tissue fluids. The beneficial effect on the patient is due to a bacteriostatic action on invading organisms, control over the multiplication of those organisms enabling the leucocytes and natural antibodies of the patient to get the " upper hand."

For the successful treatment of infection it is necessary that the drug be maintained in a certain concentration in the blood-stream for a sufficient length of time, and that the organisms causing the infection be of a type susceptible to the drug's bacteriostatic action. After oral administration the maximum blood concentration is reached within six to seven hours, and if a further dose is not given this concentration then begins to drop, the drug being almost entirely eliminated with 24 hours. In practice, therefore, it is necessary to commence treatment with a dose large enough to induce the required blood-concentration, and to maintain this concentration by regular repetition of the drug until the infection is more or less under control.

It has been found that in many local infections bacteriostasis can be induced by the topical application of sulphonamide direct to the affected tissues. Although this latter method of treatment is already gaining popularity in the field, it is owing to the apparent lack of literature on the subject that the writer has been prompted to publish this article.

The value of the treatment appears to have been first recognised in 1939 by Jensen, Johnsrud and Nelson[1], who implanted sulphonamide powder into compound fracture wounds and reported that, with no changes in surgical technique, the incidence of infection rate fell from 27 per cent. to 5 per cent. Since then the treatment has been popularised by the medical profession, and amongst earlier reports as to its value one may refer to Jeffrey[2], who quotes the treatment with apparent success of several hundred war wounds in France (1940).

Practical Considerations.—The application of sulphonamide to an injured skin or mucous membrane does not cause irritation, and, in fact, it is often found that the drug exerts a soothing effect on damaged tissues, rendering them much less painful. Many of the antiseptics used in local injuries are only able to act in a concentration which is also damaging to the tissues. Although sulphonamide has no bactericidal effect in the true sense of the term, it does not cause local tissue injury, and this, of course, is a decided advantage.

The success of local treatment depends upon the following factors:—

1. *Contact.*—For effective bacteriostasis, it is necessary that the drug be brought into intimate contact with every part of the lesion or organ under treatment.

2. *Maintenance of Local Concentration.*—As in the case of oral administration, beneficial results will only be obtained if a sufficient concentration of the drug is maintained at the site of bacterial activity long enough for the defence system of the patient to get the infection under control. Local concentration should be maintained in practice by using a preparation of sulphonamide which will be only slowly absorbed, and repeating the applications when necessary. The nature of the injury or infection does not always lend itself to repeated treatment, *e.g.*, wounds sutured after implantation, and if there is reason to fear absorption of the drug before the risk of infection is entirely eliminated, the limitations of the treatment in that particular case should be appreciated, and oral administration of the drug commenced without delay.

3. *Early Application.*—The action of sulphonamide is greatly reduced in the presence of large numbers of bacteria and toxins. Unless it is possible to make a very early application of the drug to an injured tissue or organ, care should be taken to cleanse the part before commencing local sulphonamide treatment. Local necrosis, thickened walls of inflammatory reaction, profuse discharges and deep infections, are other factors which, occurring as sequels to local injury, are detrimental to the beneficial effects of the drug.

Although the benefits to be obtained by this method of treatment, even when applied in the later stages of such infections, are sometimes spectacular, efforts should be made to commence treatment as early as possible.

4. *Nature of Infection.*—It will be appreciated from experience gained by oral administration of sulphonamide that the drug is only effective in infections caused by certain types of pathogenic organisms, *e.g.*, some strains of streptococci, staphylococci, etc. The same remarks apply to the local application of the drug, but fortunately the group of susceptible organisms constitute a very large percentage of those which commonly cause local infection in animals.

5. *No Generalisation of the Infection.*—Local infection is the result of pathogenic organisms invading the tissues and attempting to overcome the resistance of the host. Depending upon the tissue involved, initial damage, virulence of the organisms, and resistance of the host, the infection may either become generalised, remain localised, or become eliminated. Local application of sulphonamide is of very great assistance to the patient, and will on many occasions prevent a localised infection becoming generalised. It is necessary, however, for the clinician to attempt to visualise this battle between host and parasite, and if, owing to the nature of the local disease or injury, etc., there appears to be a risk of the disease becoming generalised, oral or parenteral administration of sulphonamide should be used instead of, or as a supplement to, the local treatment without delay.

6. *Toxicity.*—It might be thought that the application of a large quantity of sulphonamide to a highly vascular organ or tissue would be attended by toxic symptoms in the patient, owing to rapid absorption. It has been suggested[3] that the concentration in the blood likely to be reached by absorption from a topical application in man is not likely to be dangerous, and these remarks appear to be equally applicable in the case of animals. No cases of toxicity following local application of the drug appear to have been recorded in veterinary literature, and the writer has found that the introduction of large amounts even into such a highly vascular organ as the uterus can be safely carried out without fear of toxicity.

Methods of Treatment.—Before considering the special application of the drug to the various parts of the body, it is proposed to consider the methods in which treatment may be carried out.

It does not appear necessary to employ sterile preparations of the drug for local treatment. Harrell and Brown[4], in the experimental treatment of infected wounds, conclude that, if the preparation is contaminated by organisms or their spores, the bacteriostatic properties of the drug will effectively deal with either the organisms present or those developed from their spores. Needless to say, however, it is desirable to carry out local treatment under conditions which are as aseptic as circumstances will allow.

Sulphonamide may be applied in the form of powder, ointment, suspension or solution. There are many sulphonamide preparations on the market which are known by various trade-names. Some of these preparations are solid, and others are in solution, or ointment form. It should be appreciated that all of them resemble one another in so far as they contain one or more sulphonamide group[5], and it is upon the bacteriostatic action of these chemical groups that the action of the drugs mainly depends. For economical reasons, the preparation of choice will probably be sulphanilamide, which is also known as streptocide, sulphonamide-P or prontosil album, and is usually supplied in the form of a white or yellow powder.

Topical application of the powder may be carried out with the clean hand or by means of a powder dredger or insufflator. A powder dredger is very useful for large surface wounds, enabling a thin coating of the powder to be economically dusted into the wound as frequently as necessary. An insufflator is also useful for surface wounds of this kind, but is particularly valuable for deep ragged wounds, the pressure obtained in the insufflator carrying the powder into the depth of the wound. In other instances

it may be found more effective to apply the drug in the form of an ointment. Of the proprietary preparations of this nature one may particularly mention "Prontosil ointment" and "Uleron."

An extremely useful ointment may be dispensed to either of the following prescriptions[6]:—

℞ Sulphanilamide powder 5 per cent.
Zinc oxide.
Liq. paraffin *aa* p.ae.
Ft. Pasta.
or:—
℞ Sulphanilamide powder 5 per cent.
Iodoform.
Liq. paraffin *aa* p.ae.
Ft. Pasta.

It will be noticed the latter prescription resembles B.I.P.P., the bismuth being replaced by 5 per cent. sulphanilamide.

In the case of tubular wounds with small apertures, Legroux[7] recommends the use of sulphonamide "crayons" about 2 in. long, each containing 2 grammes of the drug. The writer suggests that this method of treatment would be particularly valuable in the local treatment of the vagina and uterus in small animals. Gelatine capsules containing the drug, or tablets intended for oral administration, could be used under similar circumstances.

Herrell and Brown (1940)[8] suggest that the best method of application is by means of a thick suspension which they prepare by adding 2 grammes of powdered sulphanilamide to 100 c.c. of an 0·8 per cent. solution of sulphanilamide in physiological saline solution. They have used this suspension with success in open or closed wounds of various types, and particularly in the treatment of infected operation wounds. The writer has used, with success, a suspension of the drug in liquid paraffin, adding sufficient of the powder to the oil to make a thin paste. Were it not for wartime conditions, glycerine would probably prove a particularly useful vehicle to be used in similar circumstances.

A useful emulsion of the drug may be dispensed as follows:—

℞ Sulphanilamide powder, grs. 175.
Ol. morrhuae, 4 oz.
Acid. oleic., ♏ 36.
Aq. calcis *ad* ℥viii.

The solubility of sulphonamide in water is low, being only about 1 per cent. It might be thought that even at this concentration beneficial effect would be derived from the topical application of an aqueous solution, but this does not appear to be the case. Perhaps this is due to the drug being too rapidly absorbed from the site of infection.

Appleby[9] has suggested the use of propylene glycol and triethylene glycol as solvents of the drug with urea, claiming that these preparations in themselves have a bactericidal effect on various organisms. These substances, however, now appear to be unobtainable in this country, and, in any case, the solubility of sulphanilamide in them is not very high, being in the region of only 5 per cent.[10] There are also various proprietary preparations marketed in solutions containing high percentages of sulphonamide, but these are generally too expensive to warrant their economical use as a local dressing.

All things being considered, it will usually be found more successful to employ the drug in solid form, ointment, or suspension, rather than actual solution, in that a solution favours too rapid a rate of absorption from the site of infection for the bacteriostatic effect of the drug to be obtained to its full advantage.

Practical Application

(A) The Treatment of Accidental Wounds.—Accidental wounds met in veterinary practice vary considerably, not only according to their situation, but also in their appearance. No hard-and-fast rule can, therefore, be laid down as to their treatment, each wound being treated according to its merits. In view of the unhygienic environment of the patient, however, it can usually be taken for granted that every wound is infected before treatment commences.

In the case of incised wounds caused by sharp objects, attempts should be made to bring about primary union by rendering the part aseptic and suturing the wound's edges. After the arrest of haemorrhage and clipping of the surrounding hair, the possibility of gross infection should be considered, and, if necessary, attempts made to eliminate it. Care should be taken to avoid the use of antiseptics which have an injurious effect on the tissues, and for this primary treatment the writer prefers the use of a hypertonic solution of saline or even plain warm water. The wound should then be implanted with sulphonamide, sutured and treated as an ordinary wound.

Provided the initial cleansing of the wound is carried out thoroughly and efficiently, the success of this treatment as shown by primary union and healing without suppuration is often amazing, even in wounds which are grossly infected at the commencement of treatment.

In the treatment of lacerated wounds, arrest of haemorrhage and removal of hair should be carried out, but even greater attention must be given to the primary cleansing. Apart from searching for foreign bodies, particular care should be taken to attend to any pockets or crevices which are likely to harbour infection. Such wounds are always suffering from varying degrees of contusion, and care should be taken not to increase this local damage by the use of irritant antiseptics, hypertonic saline again being particularly valuable for this purpose. The wound is then implanted with sulphonamide and usually left as an open wound. The sulphonamide treatment should be repeated at intervals, and if the powder is used it may be prescribed for the owner to use as an ordinary dusting powder. If infection persists in the wound to any extent after this treatment, it usually means that a pocket of infection has been left, owing to incomplete cleansing of the wound at the commencement of treatment, or that the sulphonamide has not been brought into contact with all the damaged area. In such cases, immediate drainage should be provided, and in the event of any risk of generalisation of the infection, sulphonamide should be given orally.

In other wounds where advice is not sought until infection is well established, ordinary routine surgical measures to provide drainage, etc., should not be neglected, local sulphonamide treatment being used to supplement the normal treatment of the wound.

Broken knees and other conditions frequently treated with B.I.P.P. may similarly be treated with sulphonamide ointment for which a prescription has already been given.

There is evidence that under experimental conditions sulphonamide has an activity on *Cl. tetani*[11], but passive immunisation against tetanus should not be neglected in those cases where it is usually adopted as a routine measure.

Case Reports

Case No. 1. 20/6/41. Suffolk gelding, aged five years, with a deep wound on the outer part of the off-fore coronet, caused by corrugated iron. Haemorrhage was found to be excessive; a tourniquet was applied to the limb, and the wound was then bathed with warm water, packed with a wet wool swab, and lightly bandaged, the attendant being instructed to remove the tourniquet in one hour.

22/6/41. The haemorrhage had now completely ceased. The wound was carefully bathed with clean warm water, implanted with sulphonamide-P, and then sutured under local (plantar) anaesthesia.

25/6/41. The stitches had held, and the wound appeared to be progressing satisfactorily. Sulphonamide was dusted on the wound.

28/6/41. The stitches were carefully removed, and primary union appeared to have taken place. Sulphonamide-P was dusted on the surface wound, and the attendant was instructed to dust the wound with the powder twice daily. For cleanliness the animal was now turned out.

3/7/41. The wound presented a healthy appearance and showed no evidence of suppuration. No further visits or treatment were necessary.

Case No. 2. 5/8/41. Mongrel dog, aged six years, with puncture wound in the skin of the neck in the mid-cervical region, with extensive suppuration in the subcutaneous tissue. The wound was enlarged under local anaesthesia and the subcutaneous tissues syringed with hypertonic saline solution. Streptocide suspended in liquid paraffin was then injected and repeated daily.

8/8/41. The dog appeared more comfortable and there was now no subcutaneous swelling or suppuration. Another injection of the sulphonamide preparation was made, the owner being instructed to bathe the wound with dilute Eusol once daily until it had healed. The owner subsequently reported that the dog had made a complete recovery.

Case No. 3. 25/1/42. Chow dog, aged two years, with deep painful lacerated wound 5 inches in diameter over left side of thorax, thought to be due to injury by a bull. The muscle was very badly torn, and a "pocket" extended for 3 inches in a lateral direction, terminating at a rib. The surrounding hair was removed, and the wound thoroughly syringed with warm hypertonic saline. Sulphonamide-P was implanted into the wound. The owner was instructed to dust the wound with the powder twice a day.

28/1/42. The owner reported that the wound was much less painful the next day, and the dog appeared much more comfortable. There was an excessive exudation of serum and the torn muscle presented a salmon-coloured appearance, presumably due to a layer of the powder in the serum. The owner was instructed to continue the sulphonamide treatment.

2/2/42. The wound presented a very healthy appearance, was not painful or suppurating, and there was no dry crust on the wound surface such as usually accompanies dry dressings. The "pocket" was much smaller and an active repair process was taking place. As the effusion of serum had carried some of the powder on to the coat below the wound this was removed by bathing, taking care that none of the liquid touched the wound. The sulphonamide treatment was continued.

10/2/42. The deep "pocket" had filled up, the wound was much smaller in diameter, and its surface presented a very healthy appearance. The owner emphasised that throughout treatment the dog appeared to be in no pain and the wound had never developed any pus. It was not thought necessary to see the case again.

(B) The Treatment of Compound Fractures.—In the treatment of compound fractures, implantation of sulphonamide is particularly valuable for helping to control local infection. The manner in which it is applied depends upon the method adopted to treat the fracture. After the initial cleansing of the wound and removal of destroyed tissue or loose pieces of bone, etc., the wound should be thoroughly implanted with sulphonamide. If a temporary splint is applied a dressing of wool or lint impregnated with sulphonamide powder should then be applied under the bandage. If possible, a window should be left in the bandage and

splint over the wound, and implantation of sulphonamide carried out once or twice daily until healing has occurred.

(c) The Treatment of Surgical Wounds.—Mueller[12] (Roosevelt Hospital, New York City) reports the treatment of 75 consecutive cases of peritonitis following ruptured appendix and appendectomy without a failure (20 per cent. of such cases normally die). The treatment he adopted was sulphonamide applied locally.

In view of the persistent risk of infection in surgical wounds of animals, the importance of this method of treatment cannot be over-emphasised. Such treatment may be indicated at various stages in a surgical wound. If before suturing there is reason to fear infection owing to extensive manipulation or interference, as for instance might occur in the dissection of a deep tumour, implantation of sulphonamide before suturing is a valuable adjunct in warding off infection.

If, owing to the position of the wound or the species of the animal, it is necessary to apply a protective dressing and supporting bandage, the application of sulphonamide to the surface of the wound will assist in the prevention of infection, especially if the surface of the wound becomes wet owing to the exudation of serum so favourable to bacterial growth.

If, because a wound becomes infected, or owing to subcutaneous haemorrhage or suppuration along a stitch-track, surgical interference is necessitated, implantation of the wound with sulphonamide, whether the wound is subsequently re-sutured or not, is again most useful.

In abdominal surgery, sulphonamide may be introduced directly into the peritoneal cavity. Although it is difficult to see how the drug can possibly reach every part of the peritoneum, it has been used with great success in human surgery[13]. It is claimed that at least part of this success is due to local effect, and not entirely due to a general effect after absorption. Its many indications, particularly in small-animal practice, are obvious.

In the open treatment of surgical wounds, *e.g.*, castration, fistulous withers and poll-evil operations, rig operations, etc., implantation of sulphonamide directly into the wound is also of value. It is, of course, not suggested that this treatment be carried out as a routine measure in all operations of this kind, but it is particularly indicated where extensive interference, haemorrhage, or other factors favourable to infection have occurred.

Case Reports

Case No. 4. 8/12/41. Female kitten, aged seven months. This animal was spayed on 29/11/41, and the owner now reported that the wound was discharging. The wound appeared swollen and suppuration was occurring along the stitch track. The kitten appeared to have no systemic upset. Despite dissection, it was not possible to trace the offending stitch. The wound was bathed in warm water and implanted with sulphonamide-P. The owner was advised to dress the wound with sulphonamide-P twice daily.

12/12/41. All discharge had ceased, and the wound had almost healed.

Case No. 5. 2/1/42. Cross-bred cow—due to calve at the end of February. This animal was found to be suffering from acute indigestion due to feeding on an excessive quantity of sugar beet pulp. Attempts were made to remove the gas by means of a probang, but these were unsuccessful. Owing to risk of asphyxia, it was decided to puncture the rumen by trocar and cannula, sufficient, but not complete relief being obtained. All food and water was withheld, purgatives and anti-zymotics were given, but it was thought advisable to leave the cannula *in situ* for three days.

5/1/42. The cow had completely recovered and appeared quite comfortable. The cannula was removed and the attendant was instructed to bathe the wound with warm water and Dettol twice daily.

9/1/42. The upper aperture of the wound was swollen and painful, owing to the development of a deep abscess. The wound was thoroughly cleaned and streptocide implanted into the edges and depth. The attendant was instructed to apply the powder twice daily.

13/1/42. The wound now appeared normal, and the abscess had completely subsided. Sulphonamide treatment was continued.

17/1/42. The wound appeared to be making satisfactory progress, and, owing to the expense of streptocide, the attendant was instructed to continue treating the wound with dilute Dettol solution.

No further treatment was necessary.

(d) The Treatment of Skin Disease and Burns.—The writer has had several cases of acute eczema respond most satisfactorily to repeated dressings with sulphonamide powder. Before commencing treatment, all hair on and around the lesions is removed, and the affected parts are then thoroughly cleaned to remove all discharges and scabs. If hydrogen peroxide is used for this purpose, care is taken to remove all traces of it afterwards, owing to its incompatibility with sulphonamide.

In the treatment of local pustular conditions, such as impetigo in dogs, and the pustular type of follicular mange, local treatment by the drug is very beneficial, a preparation in the form of ointment usually being found most satisfactory. For the local treatment of burns, sulphonamide in ointment form is also very useful, the most suitable preparation for this purpose being an emulsion of the drug with olive oil or castor oil, for which a prescription has already been given. All dead skin and destroyed tissue should be removed, and the part thoroughly cleaned before commencing treatment. Apart from preventing suppuration, the painful nature of the condition is relieved.

Case Report

Case No. 6. 1/7/41. Fox terrier dog, aged 6 years, with moist eczema of the neck and back. This dog had been treated for a similar condition on several previous occasions. The hair on and around the lesions was removed and the moist patches were then thoroughly cleaned with warm water and soap. Sulphonamide-P was dusted on the lesions twice daily. Internally, a purgative was given, followed by: Mag. sulph., 10 grs.; mag. carb. levis, 5 grs. *b.i.d.*

5/7/41. The lesions appeared much drier, and were not suppurating. They were again cleaned with warm water, and were found to be much less painful. The treatment was continued—recovery was uninterrupted, it being especially noticed that thickening of the skin was not so marked as on previous occasions.

(e) The Treatment of Injuries and Diseases of the External Ear.—Sulphonamide is a very useful drug to control infection in the external ear. In small animals, when a wound or ulceration of the concha necessitates immobilisation of the ear-flap by bandages, the injured part should be cleaned, and sulphonamide then applied as a dressing.

The writer has also had considerable success with the use of sulphonamide in the treatment of acute and chronic otorrhoea. Before commencing treatment, the inside of the ear is thoroughly cleansed with warm water and peroxide or olive oil, etc. The sulphonamide is then implanted as a powder, and the treatment repeated according to the severity of the condition. If the condition in the ear is very dry and painful, a suspension of the drug in olive oil or liquid paraffin is found to be the most useful preparation. Recovery, especially in acute cases, is usually very rapid.

Case Reports

Case No. 7. 20/6/41. Alsatian bitch puppy, aged 3½ months. This puppy was suffering from a painful condition of the left ear, due to multiple small pustules in its inner surface. Treatment with antiseptic lotions had been carried out for the past three days without any sign of improvement. The ear was thoroughly cleansed and then filled with streptocide, the owner being instructed to apply the powder twice daily.

23/6/31. The ear had almost completely recovered, it only being found necessary to continue the treatment for a further two days.

Case No. 8. 5/12/41. Cocker Spaniel dog, aged seven years. This patient had been under treatment at intervals during the past few months for chronic otorrhoea, various dressings having been used. For the past ten days treatment of a flare-up of the condition had consisted of daily cleansing with warm water and peroxide, and dressing with an iodoform dusting powder. This treatment had not been attended by much success. The ears were well cleaned with olive oil, the powder and secretion being removed. They were then filled with streptocide, and this application repeated twice daily.

9/12/41. The owner reported that the dog was in much less pain, and he had not noticed such an offensive smell. The ears were then cleaned with olive oil, and the owner instructed to dust them with streptocide once daily.

18/12/41. The ears were considerably improved, there being almost complete absence of suppuration and pain, despite their thickened condition. The case was not seen again—the owner being advised to dust the ears with the powder occasionally as a routine practice.

(f) The Prevention of Metritis and Vaginitis.—There appears to be no record of the use of sulphonamide as an application to the uterus or vagina. The writer has adopted this treatment on several occasions recently in large animals, and believes it to be a useful means of preventing metritis and vaginitis after difficult parturition or retained placenta, especially in mares.

The treatment of the post-parturient uterus, so far as the removal of the placenta is concerned, has always been a very debatable subject. The following practice is adopted by the writer:—

In the event of a difficult parturition, attempts are made to remove the placenta as soon as possible, provided the operation can be carried out without causing haemorrhage or damage to the uterus. This has been found particularly important in mares and in cows where laceration of the genital passage has occurred at parturition. Uterine irrigation is carried out only if the uterus is in a particularly unhealthy state, and for this purpose the writer prefers a hypertonic saline solution. If irrigation is practised, care is taken to remove all the solution introduced, the uterus afterwards being swabbed with cotton-wool.

Implantation of the uterus with sulphonamide is usually carried out after the placenta has been removed, but if difficulty is experienced in the latter operation, sulphonamide is introduced at each visit. Once the placenta has been removed and sulphonamide implantation completed, no further local treatment of the uterus or vagina is attempted. This appears to be particularly important. If laceration of the vagina has occurred at parturition, implantation of sulphonamide directly into the wounds appears to be a valuable means of preventing abscess formation or gangrene.

Sulphonamide may be implanted into the uterus in powder form, in gelatine capsules, or as a suspension or emulsion. The writer prefers the powder, the moisture in the uterus quickly taking it up from the operator's hand. Quantities up to 8 oz. may be introduced as the initial dressing, smaller amounts being employed if, owing to retained placenta, the dressing is repeated.

Apart from economy in the use of sulphonamide by this method in comparison with oral administration, a more concentrated amount of the drug is probably maintained for a longer period at the actual site of infection. Moreover, the method is simpler, especially in mares where the attendant is usually incapable of

administering capsules or balls, and drenching cannot be accomplished without a certain amount of risk.

It is not suggested that every case of dystokia should be treated in this way, but the writer adopts it as a routine measure in all cases of difficult parturition or retained placenta in mares, and in any cases in cows where there are obvious reasons for fearing acute metritis or vaginitis. These methods should not be relied upon for the treatment of acute metritis, as owing to the risk of generalisation of the infection, oral administration is imperative.

Case Reports

Case No. 9. 14/1/42. Shire mare, six years old. This mare was reported to be having difficulty with a premature foaling, slight labour pains having been in evidence for 18 hours. Examination revealed an anterior presentation of the foal, with a lateral deviation of the head and retention of the right fore-limb, the foal being wedged in the pelvic inlet. Owing to the narrowness of the pelvic inlet, the decomposed state of the foetus, and the duration of labour, extreme difficulty was experienced in correcting the presentation. The foetus was eventually removed by traction, passage through the vagina being assisted with the aid of a lubricant. The foetus was so decomposed that a front digit was torn off at the fetlock joint during the operation. The placenta was removed soon afterwards, and most of the fluid contents expelled. Six ounces of streptocide were then introduced into the uterus.

15/1/42. The mare appeared bright, with normal appetite, pulse, temperature and respirations. Mag. sulph., 2 oz. and pot. nit., 2 drachms, was prescribed, *b.i.d.* The uterus was not interfered with, but the perineal region was cleaned and the root of the tail bandaged to aid cleanliness.

17/1/42. The mare still appeared normal. No further treatment was prescribed, and she made an uninterrupted recovery.

Case No. 10. 28/1/42. 3.30 p.m.: Thoroughbred mare, nine years old. This animal had foaled prematurely at 10 a.m., and as she was still in pain, the owner sought professional advice. Another foal was delivered without difficulty. The placenta was firmly attached to the uterine wall and could not be removed. Sulphonamide-P, 4 oz., was diffusely distributed in the uterus. 10.30 p.m.: As it was 12 hours since the first foal was born, and the placenta, although firmly attached, was becoming decayed, it was thought advisable to attempt its removal. Haemorrhage of the uterus occurred during the operation, and the placenta unfortunately broke, leaving a large piece of membrane in the left uterine horn, which owing to firm attachment it was impossible to remove. Sulphonamide-P, 3 oz., was introduced into the affected horn and 10 c.c. pitutrin was given intramuscularly.

29/1/42. 8.30 a.m.: The mare was fairly bright, and had a normal temperature, but accelerated pulse. The remaining piece of placental membrane could only be partially removed in shreds, a smaller piece at the end of the horn being out of reach; 3 oz. of sulphonamide was again introduced into the affected horn. Mag. sulph., 2 oz., pot. nit., 2 drachms, was prescribed, *b.i.d.*, and a guarded prognosis was given.

30/1/42. The mare appeared normal, with good appetite, and normal respirations, temperature and pulse. Rectal examination revealed a satisfactory progress of uterine involution.

1/2/42. The mare was still normal, except for the presence of a slight uterine discharge. No further treatment was prescribed, and she made an uninterrupted recovery.

(G) The Application of Sulphonamide to the Mammary Gland.—It might be thought that the introduction of sulphonamide into the mammary gland would be an effective means of treating streptococcal mastitis, but in the writer's experience this has not been found to be the case. In the actual cases treated, the patients were in active lactation so that the failure of treatment may have been due to it not being possible to leave the drug *in situ* for a sufficient length of time to enable it to be maintained in contact with the causative organisms. The writer has now abandoned this method of treatment in preference to oral administration of the drug.

Stableforth and Hignett[14] made an experimental investigation of the value of intramammary introduction of sulphonamide several years ago and their findings were very disappointing.

The oral administration of sulphonamide is not effective in eliminating carriers of streptococcal mastitis and experimental investigations as to the value of the local application of sulphonamide in such cases are at the moment being carried out by several research workers. It is to be hoped that their findings will pave the way to a more successful method of control of this very serious disease of dairy cows.

SUMMARY

1. The uses of a local application of drugs of the sulphonamide group are discussed, particularly from the clinical point of view.

2. The value of the treatment is shown to depend upon several factors, including the maintenance of a local concentration of the drug for a sufficient length of time, the existence of a type of infection susceptible to the specific action of the drug, absence of excessive numbers of bacteria and toxins, and absence of generalisation of infection.

3. Various methods of treatment are discussed and consideration is given to the requirements in the treatment of accidental and surgical wounds, compound fractures, skin diseases, burns and diseases of the ear.

4. Evidence is given as to the value of local application of sulphonamide to assist in the prevention of acute metritis and vaginitis after dystokia or retained placenta, especially in mares.

5. The possible value of the intramammary introduction of the drug in the control of chronic streptococcal mastitis is discussed.

6. It is emphasised that the local application of sulphonamide should be used in conjunction with and not to replace other routine methods of treatment such as the provision of drainage, *débridement*, control of haemorrhage, uterine irrigation, and any general method of treatment of the patient which might be necessary.

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QUESTIONS IN PARLIAMENT

Control of Diseases of Dairy Cattle

On Tuesday last Mr. R. S. Hudson, Minister for Agriculture, informed Capt. P. Macdonald that it had been estimated that diseases of dairy cattle involved an annual loss of not less than 50,000,000 gallons of milk as well as of appreciable quantities of meat. With a view to reducing such losses he hoped to introduce at an early date a voluntary scheme for the control of dairy cattle diseases, an important feature of which would be the regular veterinary examination of dairy cows by the practitioner.

. . . . . .

Agricultural Improvement Council (Artificial Insemination Supervisory Committee)

Colonel Carver asked the Minister of Agriculture whether he is aware that, of the eight members comprising the new committee appointed to supervise work on the artificial insemination of cattle, only one is a qualified veterinary surgeon; and whether he can ensure that when future similar bodies are established to deal with animal health problems, better representation is given to qualified veterinary surgeons who specialise in this subject?

Mr. Hudson: The subject of artificial insemination covers a much wider field than the veterinary, and in appointing the committee the Agricultural Improvement Council considered that the veterinary aspects would be adequately handled by the membership referred to.

. . . . . .

County Executive Committees (Constitution)

Mr. Gallacher asked the Minister of Agriculture what methods were adopted in selecting members of war agricultural executive committees; whether the personnel has been systematically reviewed in the light of experience; how many members of these committees throughout the country are, respectively, farmers, landowners, land agents and workers' representatives; whether due care has been taken to ensure that small farmers and agricultural workers are given adequate representation; and how many members are women?

Mr. Hudson: The members of county war agricultural executive committees were originally selected by the Minister as persons suitably qualified to act as his agents in exercising the powers conferred on him by Parliament for increasing food production. The constitution of committees is kept constantly under review and changes of personnel are made from time to time as occasion may require. Each committee in England and Wales comprises a person specially representing agricultural workers' point of view and, with eight exceptions, a Women's Land Army representative, but, apart from these, individual members were selected entirely from the point of view of their suitability and not as representative of any particular class in the agricultural community. Fifty-five members are women.

THE VETERINARY RECORD

May 2nd, 1942.

"THE JOURNAL OF COMPARATIVE PATHOLOGY and THERAPEUTICS"

SINCE the publication of *The Journal of Comparative Pathology and Therapeutics* has been suspended, there has been a growing feeling among the profession, and especially among our research workers, that in spite of the prevailing war conditions steps should be taken as early as possible to re-institute a British journal for the publication of articles dealing with veterinary research—*The Veterinary Record* being primarily a "professional journal" in the widest sense of that term. It was within our knowledge that measures were afoot by the late Sir John M'Fadyean for the preservation of the *Journal* and he had intimated his particular wishes to the Board whom he had nominated.

As will be seen from our correspondence columns, it is now the desire of his trustees that that Board should proceed to implement his wishes. It is to be hoped that the profession will lend the fullest support to the members of the Board in whom Sir John reposed his confidence, to produce without delay a first-class journal which will be worthy, both of British veterinary science and of the great traditions bequeathed by Sir John M'Fadyean.

The possibility had not been absent from the minds of the officers of the Association of endeavouring to meet the need by resuming the venture under the auspices of the "National," through its affiliated society the Veterinary Research Club, but inasmuch as it is the express wish of Sir John's trustees to resuscitate the Journal in the above manner, we are confident that the unanimous feeling of the profession will be one of deference to the decision of Sir John's trustees.

Control of Contagious Abortion in Great Britain

Nature of the Vaccines Approved by the Ministry for Use in the Impending Scheme

In answer to a letter from the President, N.V.M.A., the following information has been received from the Chief Veterinary Officer to the Ministry of Agriculture and Fisheries:—

On the introduction of the scheme for the control of certain diseases of dairy stock, the Ministry will issue two vaccines for the control of contagious abortion in herds infected with that disease. No. 1 (Standard) vaccine is the strain described in the U.S.A. as Strain 19; No. 2 vaccine is the Wye 45 (20).

The available evidence suggests that both these vaccines will be effective when used in adult animals. The No. 1 vaccine, which will be used as the standard vaccine, is administered in a single dose and has been widely and successfully used for the vaccination of calves. The No. 2 vaccine, which will be used in those cases where for any reason a particular preference for it is expressed, has so far been successfully tested in adult animals, using two doses. Since it is not yet known whether it will be equally effective in a single dose, two doses should be employed. Whether this vaccine is suitable for calfhood vaccination is not yet known and until this knowledge has been acquired it should not be used for this purpose. For those herds, however, which depend on the sale of animals giving a negative agglutination test, this vaccine possesses the advantage that it does not produce positive reactors.

The use of any live vaccine other than one of the two supplied by the Ministry will not be permissible under the scheme.

In connection with the scheme for the control of contagious abortion our readers will be interested in the annotation which follows.

ANNOTATION

Contagious Abortion

After a careful consideration of the evidence the Survey Committee recommended the use of calfhood vaccination and the agglutination test in an attempt to control contagious abortion. The development of our knowledge concerning contagious abortion was described in an extensive review by Edwards (1921)[1]. In the present article therefore most attention will be paid to work carried out after 1921, and particularly to the published experimental evidence which one assumes led to the recommendation of calfhood vaccination.

Bang (1897)* was the first to show that this was an infectious disease caused by a specific micro-organism. He also reviewed some of the early opinions on the nature of contagious abortion. "The Complete Farmer" (1807) stated, "It is considered certainly contagious, and when it happens the abortion should be immediately buried, and the cow kept as widely apart as possible from the herd, and not receive the bull that goes with them." Apparently, although the infectious nature of the disease was obvious to the layman it was disputed by some scientists until the investigations of Nocard, amongst others, and finally Bang's own work provided indisputable evidence.

It was then thought that this was purely a disease of the reproductive tract, spread chiefly by the bull, although in his first paper Bang states that some animals may become infected *via* the intestinal tract. It is now realized that this is the chief method of infection and that organisms may localise in many parts of the body other than the reproductive tract.

When once the aetiology was understood two lines of work developed in an attempt to control the disease: detection of infected animals followed by isolation, and immunisation.

In this country M'Fadyean (1909) was the first to employ the agglutination test and it was hoped that, following the detection and isolation of infected cows, the disease would eventually be eradicated. A large number of tests were performed and in some herds this aim was achieved but in others eradication appeared to be impossible. At first it had been thought that cows quickly recovered from the disease following abortion, but it was soon realised that this was untrue and M'Fadyean (1924) concluded that the chronicity of the infection in many cows was the chief obstacle to any scheme of control based on a policy of isolation. The long period for which *Br. abortus* may remain viable outside the animal body is obviously a further difficulty.

The agglutination test has now been standardised (Stableforth, 1936) and it has been employed on a huge scale in the U.S.A. where it was hoped to eradicate the disease by a "test and slaughter" policy. This policy was probably inspired by the success of the tuberculosis eradication scheme and also by the desire, because of economic conditions, to reduce the number of cattle. The scheme has had a certain amount of success but because of the great expense, changed world economic conditions, the existence of "problem herds" and the occurrence of breakdowns it has had to be modified. It is to be hoped, however, that when once the incidence of the disease has been reduced by other means it will be possible, by "test and slaughter," finally to eradicate contagious abortion.

Bang (1906) showed that the vaccination of non-pregnant heifers with live cultures reduced the number of abortions when the animals were exposed to infection during pregnancy. Similar results were obtained by M'Fadyean and Stockman (1909) but they found that dead cultures were much less effective. Live cultures were then extensively employed for immunisation but as early as 1911 Schroeder and Cotton showed that *Br. abortus* could be secreted in the milk and when it was found (1918) that this organism and *Br. melitensis* were closely related it was realised that the disease might be transmitted to human beings as well as to other cattle by the inoculation of live vaccine. Hart and Traum (1925)[2], using what was probably a fairly virulent strain, showed that a proportion of lactating but non-pregnant cows developed udder infection following vaccination and stated that information based on careful investigation had been so meagre that general confidence in the method—and even justification for its use—was open to severe question. It is probable that other workers had reached the same conclusion for attempts were already being made (see Giltner, 1926) to produce immunity with non-virulent cultures, but it appears that some of the cultures were so avirulent that they had little immunising value. Eventually, however, cultures of fairly stable but moderate virulence were discovered and they were used quite extensively on mature heifers.

Judging by the dates of vaccination and first calving it is probable that M'Fadyean (1921) vaccinated calves with live cultures and it was recognised by Quinlan (1923) and confirmed by Fitch *et al.*, (1941)[3] that calves fed on milk containing *Br. abortus* were no longer infected when they reached maturity. The possibilities of calfhood vaccination, however, were not apparently realised until the experimental results of Buck (1930), and Cotton, Buck and Smith (1934) were published. The results obtained by these investigators, working for the U.S. Bureau of Animal Industry, have been summarised by Cotton (1937)[4] and are given below together with those obtained by other workers in controlled experiments with Strain 19.

A large-scale field trial of calfhood vaccination was begun in 1936 under the general direction of the U.S. Bureau of Animal Industry. A large number of separate reports have been published but the results have been summarised by Mohler, Wight and O'Rear (1941)[7].

* Where no reference is given the article will be found in *J. comp. Path.*

Table I

	Vaccinated Animals		Control Animals	
	No.	Percentage of Abortions.	No.	Percentage of Abortions.
Cotton (1937)[4] ...	43	7	33	63·9
Birch *et al.* (1941)[5] ...	35	2·8	23	26·0
Thomsen (1939) ...	328	3·3	158	25·1
*Delez (1940)[6] ...	9	33	4	75 ; ? 100

*The animals in this experiment were not exposed to infection until the second pregnancy.

In 260 herds, which at the commencement of the experiment contained 29·2 per cent. of positive reactors and 8·4 per cent. suspects, 8,182 calves have now been produced by animals which were vaccinated with Strain 19 when five to seven months old. Over one-quarter of these calves were from animals in their second and third pregnancies. The results were as follows :—

96·2 per cent. normal parturitions.
82·9 „ „ „ and the dams also had negative agglutinin titres.
3·8 „ abortions due to all causes.
1·6 „ „ „ *Br. abortus*.

In these field trials there have been no control animals but Haring and Traum (1941)[8] found there was a marked reduction in the incidence of brucellosis in the young vaccinated stock as compared with the older vaccinated animals. They obtained the following results :—

Table II

	Treatment.	Total No. of Animals.	Percentage of Abortions, Stillbirths and Premature Calvings.
Herds kept relatively free from Brucella infection by frequent blood tests	Not vaccinated	6,860	6·4
Infected herds ...	Vaccinated	2,872	5·9
	Not vaccinated	1,763	13·9

Haring and Traum (1937)[9] showed that the vaccination of pregnant animals with Strain 19 might or might not produce abortion but that the vaccination of mature non-pregnant heifers did not produce infection. Mingle *et al.* (1941)[10] state that the virulence of Strain 19 was not enhanced by passage in guinea-pigs or even when it was obtained from the foetuses of successive cows made to abort by massive inoculation.

The latest report of the field results in America was given at a recent meeting of the Royal Society of Medicine by Dr. C. K. Mingle and is summarised in Table III.

A consideration of all the evidence led Mohler (1941) at the 49th meeting of the U.S. Live-Stock Sanitary Association to recommend the use of calfhood vaccination as an adjunct to the test and slaughter policy. He stressed, however, that to achieve success a number of precautions would have to be carefully observed and that there would have to be a considerable amount of central control.

Calfhood vaccination is advantageous because the resultant agglutinin titre disappears relatively rapidly and by the time the animals are mature the interpretation of the agglutination test is not confused. There is also no danger of inoculating pregnant animals. There is, however, no evidence that the immunity produced by calfhood vaccination is any greater than that produced by the inoculation of mature heifers, and Haring and Traum (1941)[8] state that when the " test and slaughter " policy is not being carried out there is no good reason for a veterinarian to refuse to vaccinate non-pregnant cows in infected herds. They point out that by this method much quicker results are obtained and they eradicated the disease in six years, from a herd in which 44 per cent. of the cows were infected, without removing any diseased cows until they were economically useless.

This aspect of the problem will obviously require very careful consideration in Great Britain in view of the paramount need for rapid results.

The American work has been on a large scale and has been described first, but precise work has also been carried out in this country. McEwen has performed numerous experiments in guinea-pigs and cattle with a strain of low virulence (Strain 45) and certain of its variants.

Table III

Calfhood Vaccination Field Experiment
Accumulative Results covering 19,400 Animals Vaccinated between January 1st, 1936, and July 1st, 1941

Calvings		
Total.	Normal.	Abortions.
14,280	13,804 (96·7 per cent.)	476 (3·3 per cent.)
Agglutination Test Results following Parturition		
Negative.	Positive.	Suspicious.
Normal Parturitions—13,804 (96·7 per cent.)		
11,801 (85·5 per cent.)	569 (4·1 per cent.)	1,434 (10·4 per cent.)
Abortions—476 (3·3 per cent.)		
298 (62·6 per cent.)	142 (29·8 per cent.)*	36 (7·6 per cent.)*

* Thus, of the total calvings, only 178 aborted (*i.e.*, 1·2 per cent. of the total) and showed positive or suspicious agglutination reactions.

Throughout this work the different strains or variants have been maintained at a standard degree of virulence by the use of dried cultures, a precaution which has not apparently been observed by other workers. The original strain is probably of insufficient virulence to produce a satisfactory immunity in cattle but during the course of passage in guinea-pigs a variant (45–20) of greater virulence was produced (McEwen, 1938)[11]. In the same study it was concluded that the degree of immunity produced depended primarily on the virulence of the strain and not at all on whether it was in the smooth or rough phase.

McEwen (1940)[12] has shown that Strain 45 (20) following subcutaneous injection will produce infection and abortion in a proportion of pregnant heifers. This was confirmed (McEwen, 1941)[13] but it was shown that following subcutaneous or even intravenous inoculation Strain 45 (20) failed to infect non-pregnant heifers. It thus appears that Strain 45 (20) is of approximately the same virulence as Strain 19. McEwen (1940)[14] has shown that heifers inoculated before and after service with strain 45 (20) have a marked resistance to infection with a fully virulent strain which produced abortion in all the control animals.

It will be realised that as Strain 45 (20) is " rough " it does not produce agglutinins. If, therefore, further results show that it has the same antigenic value as Strain 19 its use will obviously be advantageous as the interpretation of the agglutination test will not be confused and there will be even less reason for confining inoculation to calves.

John Francis.

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[5] *Cornell Vet.* **31.** 170.
[6] *J.A.V.M.A.* **97.** 581.
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[8] *J.A.V.M.A.* **98.** 278.
[9] *J. Agr. Res.* **55.** 117.
[10] *J.A.V.M.A.* **99.** 203.
[11] *Vet. Rec.* **50.** 1097.
[12] *Ibid.* **52.** 97.
[13] *Ibid.* **53.** 351.
[14] *Ibid.* **52.** 815.

[As previously intimated, where no reference is given the article will be found in *J. comp. Path.*]

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Calfhood Vaccination in the U.S.A.

Duckworth (1941)* notes that calves are now being vaccinated with Strain 19 by veterinary surgeons employed by the Bureau of Animal Industry. He goes on to say: " Bang's disease control, including vaccination, can become a governmental function; it can be done by practitioners or by the owners with material purchased directly. I am reluctant to believe that, with its better qualifications for the work, the veterinary profession will allow the work of Bang's disease control to slip through its fingers.

* *J. A.V.M.A.* **99.** 462.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

May 4th.—Meetings of Committees, N.V.M.A., at 36, Gordon Square: Finance and General Purposes, 11.15 a.m.; Survey, 2.30 p.m.

May 5th.—Meeting of the Organising Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 10.30 a.m. Meeting of Council, N.V.M.A., at the London School of Hygiene and Tropical Medicine, Keppel Street (Gower Street), London, W.C.1, 2 p.m.

May 6th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.

May 6th.—Annual General Meeting of the Eastern Counties Division, N.V.M.A., at Norwich, 2.15 p.m.

May 7th.—Meeting of the Central Veterinary Society, at the Conway Hall, Red Lion Square, W.C.1, 2.30 p.m.

May 8th.—Meeting of the Lancashire Division, N.V.M.A., at Liverpool, 2.15 p.m.

May 9th.—Special Meeting of the Scottish Branch, N.V.M.A., at Glasgow, 2.30 p.m.

May 11th.—R.C.V.S. Animal Management Examination begins.

May 15th.—Meeting of the Sussex Division, N.V.M.A., at Brighton, 2 p.m.

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Service in the Home Guard

POSITION OF PRACTISING VETERINARY SURGEONS

On March 28th the Secretary of the Royal College of Veterinary Surgeons addressed a communication on the above matter to the Ministry of Agriculture, the text of his letter being as follows:—

"Can you tell me whether the new Order providing for compulsory recruitment for the Home Guard contains any provision for exemptions to be granted from such service in the case of practising veterinary surgeons? It is well known that many single-handed practitioners have a large area to cover and are working 12 hours a day. In addition they are often called out during the night. This kind of occupation does not leave any time free during which a practitioner could attend regularly for training. I have not seen details of the compulsory scheme, but there are only 24 hours in the day, and if a man is doing already as much as he is physically capable of performing, I do not see how he can undertake additional duties. People who have regular hours of employment are in a quite different category.

"It is to be hoped, therefore, that in administering the new Order, regard will be had to the special circumstances in which veterinary practice is carried on."

In their reply, dated April 13th, the Ministry expressed regret for delay (stating that the enquiry concerning the exemption of veterinary surgeons from the Home Guard had necessitated consultations with the Ministry of Labour and National Service) and proceeded: "The present regulations do not contain any provision exempting veterinary surgeons as a class from compulsory enrolment in the Home Guard. The position is that if a veterinary surgeon objects to enrolment and the Ministry of Labour do not propose to accept the objection, the veterinary surgeon will be sent a further letter informing him that it is proposed to enrol. The veterinary surgeon will be told in this letter that if he wishes to appeal against this decision he must apply to the Government Department principally concerned with the work on which he is engaged, but if he receives no communication from the Ministry of Labour within 14 days from the date of the letter directions to enrol him will be issued. Objections made by veterinary surgeons will be dealt with by War Agricultural Executive Committees for the county in which the veterinary surgeon practices. In referring the matter to the Committee, the veterinary surgeon should state the name and address of the local office of the Ministry of Labour which is dealing with the case.

"The Ministry, following its consultation with the Ministry of Labour, feels that it is unlikely that local offices of the latter Department will call on veterinary surgeons to enrol in the Home Guard. The arrangements described above should, it is felt, provide adequate safeguards."

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VETERINARIANS AND THE WAR AGRICULTURAL EXECUTIVE COMMITTEES

We are glad to be able to record the fact that the county war agriculture executive committees, who are now turning their attention to animal health problems, are seeking to enlist the services of members of the veterinary profession in this connection. Mr. James McWilliam, M.R.C.V.S., of Nantwich, has been appointed a member of the War Agricultural Executive Committee for Cheshire.

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DEATH OF COLONEL G. K. WALKER

Many of our readers, especially those who have had service in India, will read with deep regret of the death, which occurred suddenly from cerebral haemorrhage, of Colonel George Kemp Walker, C.I.E., O.B.E., V.D., D.L., F.R.C.V.S.

Colonel Walker, to whom fuller tribute will be paid in our next issue, was one of the earliest workers in the Civil Veterinary Department, having been seconded from the Army Veterinary Corps to the department before that Service was manned by civilian officers. He had served at Muktesar under Dr. Lingard in the early days of that laboratory; he also saw many years' service in the Punjab and in the Bombay Presidency. During the last part of his career Colonel Walker was Principal of the Punjab Veterinary College at Lahore, which is one of the finest veterinary colleges in the world as regards building and equipment. Colonel Walker, indeed, was outstanding in his contribution to the organisation of the field Veterinary Service in India and he was also active in the promotion of veterinary education in India. He had a distinguished military career, which will be dealt with later, being honorary A.D.C. to the Commander-in-Chief, India, 1919-25.

After his retirement he was elected a member of the Council of the Royal College of Veterinary Surgeons, where he sustained his interest in veterinary education. His life at Abingdon was a very active one. Colonel Walker was a Justice of the Peace and a member of the Berkshire County Council, becoming Deputy Lieutenant of the County. He was Chairman of the Abingdon Branch of the British Legion, while he was prominent in Freemasonry, being a Past Grand Deacon (England). It is fitting that we should recall here that, despite all these and many other interests, Colonel Walker found time to render valued assistance to the Editorial Committee in the preparation of notices of the many periodic reports issued from the administrative, research and teaching centres of the sub-Continent—a recurrent task which he undertook with unwearying readiness.

To the widow and other members of the bereaved family we extend our deepest sympathy.

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R.C.V.S. OBITUARY

CULHANE, Joseph Michael, Capt. late R.A.V.C. (S.R.). Graduated Dublin, July 10th, 1915. Died April 10th, 1942, aged 48 years.

The late Captain Culhane, who died in a private nursing home at Dun Laoghaire, was British Government Veterinary Officer at Nyasaland from 1920 to 1939. Educated at Clongowes Wood College, and trained at the Veterinary College of Ireland, where he qualified in 1915, he was attached to the R.A.V.C. until 1919, and served with the British Army of Occupation in the Rhineland.

SADLER, Michael T., Capt. late R.A.V.C. (T.F.), Newchurch, near Burton-on-Trent, Staffs. Graduated London, May 22nd, 1891. Died April 17th, 1942; aged 72 years.

"There is almost universal complaint amongst farmers that the cost of employing a veterinarian for vaccination is too high; that the product can be purchased direct from the biologic salesman and used by the owner at a fraction of the cost charged by the veterinarian.

"Many men have previously had to change their methods to meet new competition and I feel that the veterinarian is now in this position, but he does not have to try anything new; he merely has to repeat what history indicates was successful. The largest practices have been built on the contract system and in my opinion Bang's disease control is admirably suited to this system. Routine calls would be made and at the same time any other necessary work could be carried out."

Walker, George Kemp, C.I.E., O.B.E., V.D., D.L., F.R.C.V.S., Colonel I.V.S. (retd.), Norman House, Oxford Road, Abingdon, Berks. Graduated London, May 12th, 1893; Fellow December 13th, 1904. Died April 21st, 1942; aged 70 years.

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Capt. Michael T. Sadler, M.R.C.V.S.

We announce above, with much regret, the death of Capt. Michael Thomas Sadler, which occurred suddenly at his residence at Newchurch. He was a successful practitioner and a highly-respected member of the profession, and his services were in great demand in many parts of the country, especially with regard to the care and treatment of racehorses, hunters and polo ponies, in which he specialised.

Capt. Sadler was the third son of the late Mr. Alfred Sadler, J.P., of Tamworth, and prior to going to London to take his diploma course as a pupil he served with the late Mr. Harry Olver, F.R.C.V.S., of Tamworth, whose residence adjoined Captain Sadler's home.

He joined the late Mr. George Wartnaby in partnership, and the firm of Wartnaby and Sadler was very well known over a wide area. This partnership was severed in 1915 by the death of Mr. Wartnaby.

On many occasions, Captain Sadler was one of the official veterinary inspectors for the London Shire Horse Society and for the Hunters' Improvement Society's annual show. He had been veterinary officer to the Derbyshire Agricultural Society, the Meynell Hunt Agricultural Society, and the Staffordshire Agricultural Society for many years. He was also a veterinary surgeon to the Derby Racecourse Co., and acted in that capacity for many other Midland race meetings. For many years Captain Sadler was the official veterinary inspector under the Ministry of Agriculture and Fisheries for the counties of Derbyshire and Staffordshire.

Captain Sadler had a long and distinguished military career, commencing in 1909. The *Burton Daily Mail* records that he became veterinary officer to the 4th North Midland Howitzer Brigade, taking charge of 500 horses for camp at the annual training. At the outbreak of war in 1914 he was asked by the War Office if he would volunteer to take charge of the No. 2 Reserve Park Unit of the Expeditionary Force. This he did, and he was in France by August 12th, 1914, taking part in the retreat from Mons to the Marne, and suffering, like others, great hardships. He was actually the last soldier over the Marne Bridge before it was blown up. He came home again on business leave in October, 1915, and was later sent to the U.S.A. for the purposes of buying horses for the British Army. In this connection the *Mail* observes: "Many thousands of horses and mules passed through his hands, and the experiences he could relate about them made a wonderful account. It was always said that those horses which passed through his hands and carried his brand were the best that ever came to this country. When the horse purchasing was completed he was sent to take charge of the remount horses in Ireland, with headquarters at the Balls Bridge, Dublin, where he remained until hostilities were over."

The tribute quoted makes reference to Captain Sadler's many activities as a sportsman, stating that in his younger days he was a keen boxer, a prominent member of the Burton Rugby Club, which he captained when it ran one of the foremost teams in the country, and that throughout his life he was renowned for his fine horsemanship and as a judge of a horse. He was a keen member of the Atherstone and Meynell Hunts for many years.

Captain Sadler married Mary Avicen Stanley, a member of a well-known Burton family, who survives him. Much sympathy is extended to the widow, the four daughters and the son, Captain M. C. S. Sadler, M.R.C.V.S., of Burton, who served through the last war in the Middle East with the Derbyshire Yeomanry, winning his commission and the Military Cross on the field.

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PERSONAL

Birth.—Cameron.—At 71, Great King Street, Edinburgh, on April 14th, to Mary, wife of John Cameron, B.Sc., M.R.C.V.S., D.V.S.M., of Wreay, Carlisle, a daughter.

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Will.—Mr. Tom Cooper Fletcher, Norton Lane, Sheffield, veterinary surgeon, left £12,735.

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WASTE OF AGRICULTURAL FOODSTUFF ORDER

As a complementary measure to the Waste of Food Order, 1940, made by the Minister of Food, the Waste of Agricultural Foodstuff Order has been made by the Minister of Agriculture and Fisheries. "In the present situation it is imperative to conserve food of every kind," states the latter Ministry, in making the announcement, and continues: "Crops and stocks of corn or other products on farms, whether intended for human consumption or for animal consumption, are potential food. It will enable action to be taken against anyone who negligently causes waste or damage to agricultural crops, whether before or after harvesting, or to stocks of grain or purchased feeding-stuffs on farms."

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GRANTS FOR MILK RECORDING

Answers in Parliament, as noted in our columns, have revealed a continuance of the Ministry's negative attitude to the demand that grants to milk-recording societies be renewed. The organisations concerned are, however, persisting in their endeavours, and a request to this end was put forward at the annual meeting of the British Dairy Farmers' Association.

Mr. C. H. Clarke, Secretary of the Red Poll Cattle Society, brought forward the matter with a request for support to a resolution by the Central Council of Milk Recording Societies asking the Government to renew the grants. Mr. R. Shanks said they were bound to recognise the fact that only 5 per cent. of the dairy cows in England and Wales were recorded. That the benefit of recording went to the farmer was emphasised by Mr. James Mackintosh, who was in favour of making grants to societies for a period to enable farmers to learn the benefits and advantages of recording. The President (Mr. G. Miller Mundy) said the difficulty was to get the recorders at the present moment.

The President (Mr. G. Miller Mundy) said the difficulty was to get the recorders at the present moment.

The Executive Committee is to consider the question of an approach to the Ministry for the renewal of the grants that were formerly made.

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Weekly Wisdom

The scientific approach is useful and effective in interpreting phenomena in all fields of human knowledge and will aid in solution of all problems with which the human race is confronted—McDaniels. (1941.) *Science.* **94**. 243-248.

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.
The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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"THE JOURNAL OF COMPARATIVE PATHOLOGY AND THERAPEUTICS"

To the Editor of the Veterinary Record

Sir,—As executors for our father's estate we have given much thought to the best method of securing the future of *The Journal of Comparative Pathology*, which he edited alone, with justifiable pride, for fifty years.

After full consideration we invited Prof. T. J. Bosworth, Dr. J. T. Edwards, Mr. R. E. Glover and Prof. J. G. Wright to form an Editorial Board and accept the ownership of the Journal. In taking this action we were actuated by the knowledge that our father had during his life-time enlisted the help of these gentlemen in an informal Editorial Committee—an arrangement which only failed to function owing to the war situation and our father's advancing years.

We are happy to say that our invitation was accepted, and it only remains for us to wish continued success to one of our father's oldest children—and one which scarcely caused him a minute's anxiety.

We are, Sir,
Yours obedient servants,
Andrew McFadyean.
Kenneth McFadyean.

3, St. Helen's Place,
London, E.C.3.
April 23rd, 1942.

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THE N.V.M.A. SURVEY COMMITTEE'S SCHEME

To the Editor of the Veterinary Record

Sir,—Are members of this Committee running amok? Reports appear in the Press of addresses to farmers, giving them more news of this scheme than has yet been given to the veterinary practitioner. One member of the Committee informs them that the scheme will start in June and that any farmer

wishing to do so sooner can do so. Therefore, I am being requested by clients to forward them the recognised agreement to sign. Has any practitioner seen the printed agreement yet? Has any practitioner been advised of the type of vaccine to be used as a preventive of *Br. abortus* infection? Or if the practitioner feels treatment other than that suggested is necessary, who pays?

I am absolutely in agreement with the profession launching a scheme of preventive medicine and control of disease, and at an early date, but (1) let it be administered by a department of the State, the Ministry of Agriculture and Fisheries, who can apportion the work and be responsible for the financial aspect; also, (2) all owners of cattle should come within the scheme so that disease can be controlled (as in foot-and-mouth disease).

My experience to date is that clients making these inquiries already employ me to control these diseases and are simply attracted by the lower cost of sulphanilamide.

May I repeat my remarks made at a Society meeting—that unless all cattle-owners are in this scheme the improvement in statistics hoped for by the Committee at the end of one year will be very very slight; then what of the scheme?

Yours faithfully,
G. W. Searles.

Alresford, Hants.
April 21st, 1942.

[Although it is expected that the date upon which the Survey scheme will come into operation will be an early one, it has not yet been fixed; consequently the printed agreement has not yet been issued.

An official announcement relative to the type of vaccine to be used as a preventive of *Br. abortus* infection is made on page 175 of this issue.—*Editor.*]

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BOVINE INFERTILITY

To the Editor of the Veterinary Record

Sir,—Apparently Mr. Smythe's recent letter in this paper has caused a certain amount of interest; but whilst there have been several criticisms of his apparently flippant manner, I wonder how many members have taken sufficient notice of the very real danger about which Mr. Smythe has warned us, between the lines of his rather wittily-worded letter.

The treatment of infertility of cattle is both an art and a science, and those members of our profession who have conscientiously undertaken this work will realise that each herd, and each animal, must be considered and treated on its own particular merits. Endometritis is not the only cause of infertility by a very wide margin; and ovarian dysfunction, and particularly anoestrus, are of great importance.

How many people, for instance, will be anxious to inject pregnant mare serum into anoestrous beasts at about 14s. per dose, when they only collect 12s. 6d. for a year's attention to the animal?

Whilst the recommendations of the Survey Committee are, in the main, sound, do not let us make the mistake of adopting a rule-of-thumb method of undertaking work which requires great skill, knowledge and experience to bring successfully to a conclusion.

Let those critics of Mr. Smythe's flippancy read his letter again and think very carefully.

Yours faithfully,
L. Guy Anderson.

49, Cambridge Street,
Aylesbury,
Bucks.
April 25th, 1942.

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WEYBRIDGE TUBERCULIN

To the Editor of the Veterinary Record

Sir,—If we are to judge from all that has been published on the above subject recently, not only in *The Veterinary Record* but also in the lay Press, then we must come to the conclusion that by enforcing the use of this product the Ministry of Agriculture has committed a serious offence against herd-owners. In fact, according to some members of our profession the tuberculin testing of cattle to-day is a mere mockery.

It seems to me rather unusual that we as practitioners should have had to call in a member of the medical profession, in the person of Dr. Chalmers Watson, to champion our cause and give vent not only to our grievances, but to those of all interested herd-owners.

Perhaps the Ministry should have consulted many more scientific people before they decided to issue this product for use on the herds throughout the country, but what useful information they could have hoped to acquire by consultation of herd-owners absolutely puzzles me. For that matter, how could practitioners be expected to give any opinion about a tuberculin of which they had had no experience?

I entirely agree with the witty remark that Circular No. 228 had been issued mainly for students. Having tested some thousands of cattle since May, 1940, I feel convinced that the Ministry must have made a very thorough study of their product before issuing such a concise circular for the guidance of anyone who wished to use the product correctly.

Herd-owners in this district do not complain about its use; in fact, I would say it is rather the reverse. They seem to be thoroughly satisfied with its results. I am just wondering what they will think of all this controversy. Even dealers in this part of the country, who put thousands of cattle through their hands annually, are loud in their praises of Weybridge tuberculin. I was rather puzzled by one dealer from England telling me that he was forced to buy in this district simply because he always found that our cattle invariably stood up to a re-test. I can assure you that he was not getting them away for nothing, and when he first made this remark I wondered if we were the only people using Weybridge tuberculin. Scientific workers tell us that no intradermal test can be 100 per cent. correct and I will admit at once that having to conduct comparative tests is a laborious business, but surely it is a mere detail if it enables us to pick out the animals affected with bovine tuberculosis.

Dr. Wooldridge, in my opinion, very correctly stated in the discussion on this subject that the Ministry were not the only people to err in the matter of tuberculin testing of cattle. In my experience the tuberculin used previous to Weybridge varied very much in potency. Some batches of it failed miserably to pick out reactors and everything in the garden seemed lovely till the next batch of what was supposed to be the same tuberculin arrived.

I really think that the Ministry has made a stout effort to improve on previous tuberculins and only wish that this much-abused Weybridge product had been evolved years ago. I would be very interested to know if any other districts have had similar experiences to mine, or must I believe that the general opinion expressed so freely at the Society of Veterinary Practitioners' (Division N.V.M.A.) meeting of January 15th last is representative of the profession.

Yours faithfully,
H. Gillmor.

Ayr.

[The Association is shortly publishing an official statement from the Ministry of Agriculture upon the recent history of the tuberculin test in this country.—*Editor.*]

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THE HISTORY OF PREVENTIVE MEDICINE

To the Editor of the Veterinary Record

Sir,—In a letter published in *The Veterinary Record* for April 11th, Mr. E. P. Edwards states that in 1796 Edward Jenner discovered vaccination, and that from his obscure village near Kharkov the young Russian physician Mechnikov gave to the world the scientific basis for the vaccine. Mr. Edwards will forgive me for pointing out that neither statement is correct.

Edward Jenner gave the word vaccination to a process of immunising the human subject against small-pox by inoculation with cow-pox matter, of which he learnt by accident from a dairy maid, and which he proved by personal experiment was both safe and reliable. But he did not discover the process, as we are informed by an epitaph in the churchyard of Worth Matravers, Dorset, and which commemorates Benjamin Jesty, the first-known person to inoculate his wife and two sons with cow-pox in 1774. Earlier still, vaccination, or inoculation as it was termed, against human small-pox was effected by the use of pus from small-pox cases, a device practised in the East for centuries and introduced into this country by Lady Mary Wortley Montagu on her return from Constantinople in 1720.

Elie Metchnikov was approaching his 'fifties when he made the discovery to which Mr. Edwards alludes, was residing at Rigno, a suburb of Messina, and never held a medical diploma in his life. A zoologist, his academic interest in the wandering mesodermal cells alone made possible his immortal discovery of the function of the leucocytes.

In 1787 Johann Gottleib Wolstein protested against the bad old custom of heavy bleeding which was practised in human and veterinary medicine as a standard treatment. A pupil of John Hunter, and for twenty years director of the Vienna Veterinary Institute, Wolstein, a veterinary surgeon, pointed

out that fever is not a disease, but a symptom, and nature's best weapon against disease.

Since sterility is now "news," it is also interesting to recall that the Abbé Spallanzani (1729-1799) was the first to practise artificial insemination, impregnating a bitch by injecting warm semen into the vagina.

Gideon Mantell, surgeon and geologist, quotes in the catalogue of his private museum, founded *circa* 1820, an extract from *The Quarterly Review* which, sir, I may perhaps use as excuse: "To insist on the high importance of scientific studies, whether as enlarging the sphere of our intellectual enjoyment, or as contribution to our rank and power as a nation, would, in the present age, be altogether superfluous."

Yours faithfully,
ERNEST GRAY.

Barn Hill,
Thurston,
Suffolk.
April 15th, 1942.

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THE COMPETENCE OF THE NEWLY-QUALIFIED

To the Editor of the Veterinary Record

Sir,—It is as a recent graduate that I am stimulated to crave a small space in your columns, in reply to Mr. Robertson's communication which appeared in your issue of April 11th.

In his letter Mr. Robertson makes very grave imputations, not only against the efficiency of the recently qualified, but also, indirectly, against that of the devoted veterinarians, both inside and outside the colleges, who spend their time in the instruction of the student.

A year or two's post-graduate experience in veterinary practice enables one to discriminate between professional efficiency and inefficiency; in virtue of this, I venture to affirm that his assertion, "a high percentage are no use at their job," is not only unfair, but untrue.

That the newly-qualified are relatively inexperienced must, of course, be a fact, but, Mr. Robertson, experience is not all. The learned physicians of Charles II were most decidedly not lacking in experience, but the severest critic of to-day would hesitate to censure the recently qualified physician of our own time who refused to alternate leeches with bleeding in the treatment of a case.

That *The Veterinary Record* is perused by many readers outside the profession, is clearly shown by recent correspondence; an attack on a section (if we may group the newly-qualified as a section) of the veterinary profession by one of the elders of that profession, scurrilous as the attack appears to be, cannot but help to discredit the profession as a whole. This is to be deplored, especially at a time when we are seeking the co-operation of the whole laity, in order to further the advancement of the cause in which we are all striving.

Be not afraid, young graduates and students; we will not cast aside our aims and ideals because all the fathers of the profession are not with us; there are "broader lands and better days" for the veterinary profession too, but we must walk through the dark valleys of criticism before we reach the sunlit plains which undoubtedly lie ahead.

Yours faithfully,
TREFOR LL. GRIFFITHS.

101, Mount Pleasant,
Redditch,
Worcs.
April 18th, 1942.

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To the Editor of the Veterinary Record

Sir,—As the competence of the newly-qualified has again been questioned in your correspondence columns, the following extract from the editorial of *The Veterinary Journal* for July, 1880, may perhaps be of interest.

"From every side come more or less serious complaints as to the defective training of many recently-graduated veterinary surgeons, in those practical details of their calling which go such a long way to rendering them competent to perform their duties satisfactorily to the public and with credit to their profession. These complaints are probably not of recent date, but were coeval with the introduction of veterinary science into this country. From that time up to the present, it appears that a practical training of the veterinary student could not be ensured; and though very many members of the profession have received such training before they entered the schools, others have not. Indeed, it is a fact that many candidates for admission to the schools knew nothing whatever with regard to handling or controlling the domestic animals, or their nature or habits before they became students. . . . Scores of men who had failed in everything else they attempted have joined the schools as a last resource; and without any acquaintance whatever with the most essential requirements of a practitioner, have attended the classes, where they have never administered a dose of medicine, performed, or even saw performed all, if any, of the many operations which a veterinary surgeon may have to undertake; witnessed but few cases of disease or lameness; were not instructed in conformation or the defects of horses; could not venture to handle a horse, cow, sheep, dog, or pig—in fact, with the exception of cramming from lectures or books, were utterly incapable of practising the veterinary art, or comprehending the application of veterinary science."

As the editor of that date states, such complaints were "coeval with the introduction of veterinary science into this country," and when we consider the progress which has been made by our profession during the past sixty years, in spite of this and similar indictments of the newly-qualified, need we despair of the future?

Yours faithfully,
GEORGE A. WILLIS.

Liverpool.
April 27th, 1942.

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TOWARDS *OUR* "NEW ORDER"

To the Editor of the Veterinary Record

Sir,—I was interested to read in Col. J. W. Rainey's letter under this heading that social planning for future Anglo-Saxon communities is largely a waste of time until individuals can be induced to breed sufficiently to resist ultimate conquest by more philoprogenitive races.

It would, I think, be of interest to point out that the much publicised rise in the German birth-rate since 1933 can in the main be attributed to the suppression of illegal abortion, but, bearing this in mind, we still find that the birth-rate under the Hitler régime has never reached a level high enough to replace existing numbers.

Since the outbreak of declared war the German birth-rate has continued to decrease alarmingly, as does the Italian despite Il Duce's fifteen years of intensive campaign.

Now that contraceptives are available to the community it is my humble opinion that the birth-rate will never increase to our satisfaction until drastic social and economic changes are brought about producing an environment in which children will be desired.

Yours faithfully,
CLIVE HOLLIDAY-POTT.

Winchelsea House,
Kingston-on-Thames.
April 20th, 1942.

. . . . .

To the Editor of the Veterinary Record

Sir,—Mr. Rainey's letter in the current issue of *The Veterinary Record* opens up a problem as wide as the world itself, yet it can be said at once that no social revolution anywhere can retard the mental evolution of our day and such evolution will settle the problem.

If the expansively acquisitive elements of the less sophisticated races regard their present increasing populations as inevitably bringing them to the overthrow of the Anglo-Saxon peoples, they have an in-coming tide of silent opposition to their scheme; I speak of the film, the wireless, and of air transport. Through these agents, the emancipation of the women of the West is the immediate forerunner of that which will happen in the East, and as the Eastern "fair sex" assume a more equal status they will also take into their hands the control of what shall happen to them. Not even an Asiatic woman is a breeding ground of her own free will.

One of the first and most important discussions which will develop (it has already been tabled) in the New League will be the control of population. I hardly need to elaborate on what opposition there will be and from which quarters it will develop, but the problem—for so many reasons—is so urgent that it holds first place in the minds of all thinking people.

An even more important condition which faces civilisation is that of establishing a truly balanced morality, and I have not the slightest doubt that the British nation will take its full share in moving forward to an ordered living which no other forces of the world will ever be able permanently to oust.

Yours faithfully,
THOS. A. DOBIE.

27, Shrewsbury Road,
Birkenhead.
April 24th, 1942.